

STEP II, 1999, Q12

- 12** It is known that there are three manufacturers A, B, C, who can produce micro chip MB666. The probability that a randomly selected MB666 is produced by A is $2p$, and the corresponding probabilities for B and C are p and $1 - 3p$, respectively, where $0 \leq p \leq \frac{1}{3}$. It is also known that 70% of MB666 micro chips from A are sound and that the corresponding percentages for B and C are 80% and 90%, respectively.

Find in terms of p , the conditional probability, $P(A|S)$, that if a randomly selected MB666 chip is found to be sound then it came from A, and also the conditional probability, $P(C|S)$, that if it is sound then it came from C.

A quality inspector took a random sample of one MB666 micro chip and found it to be sound. She then traced its place of manufacture to be A, and so estimated p by calculating the value of p that corresponds to the greatest value of $P(A|S)$. A second quality inspector also took a random sample of one MB666 chip and found it to be sound. Later he traced its place of manufacture to be C and so estimated p by applying the procedure of his colleague to $P(C|S)$.

Determine the values of the two estimates and comment briefly on the results obtained.



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